IN THE CLAIMS

Please amend claims 34, 36-45, 47, and 48, stricken out or double bracketed material deleted, underlined material added, as follows, with parenthetical status identifiers provided in relation to the originally filed international application:

1. (Previously presented) In a photorealistic image synthesis method wherein stored digital representations of physical three dimension object scenes are selectively input, and one or more user-defined shading routines are selectively called upon in the course of assessment of the stored digital representations of physical three dimension scenes in furtherance of the production of a rectangular output array of pixels representing the visible set of surfaces of each of the stored digital representations of physical three dimension scenes, the step comprising:

a. executing an interval branch-and-bound method to compute shading values for pixels, to a user specified certainty, of the rectangular output array of pixels representing the visible set of surfaces of each of the stored digital representations of physical three dimension scenes by successively splitting each object of the objects of the physical three dimensional object scenes, said each object having a surface delimited by a non linear function.

2. (Previously presented) The photorealistic image synthesis method

of claim 1 wherein said non linear function is parametric.

3. (Original) The photorealistic image synthesis method of claim 2 wherein an interval analysis is performed over a parametric domain of said each object of the objects of the physical three dimensional object scenes.

4. (Original) The photorealistic image synthesis method of claim 3 wherein consistency is evaluated against a domain of a screen coordinate system.

5. (Previously presented) The photorealistic image synthesis method of claim 1 wherein unknown parametric variables of said non linear functions are ascertained using interval analysis.

6. (Original) The photorealistic image synthesis method of claim 5 wherein consistency is evaluated against a domain of a screen coordinate system.

7. (Previously presented) The photorealistic image synthesis method of claim 6 wherein a solution set for said parametric variables is input to the one or more user-defined shading routines.

8. (Original) The photorealistic image synthesis method of claim 7

wherein an assessment of consistency against said screen coordinate system includes transformation of boxes representing select areas within said local coordinate system into said coordinate system of said screen.

9. (Previously presented) The photorealistic image synthesis method of claim 8 wherein splitting of said successive splitting each object of the objects of the physical three dimensional object scenes is performed in x and y dimensions of said domain of a screen coordinate system.

10. (Original) The photorealistic image synthesis method of claim 9 wherein said splitting is terminated upon satisfying a user-specified dimension criteria for either said x or said y dimension.

11. (Original) The photorealistic image synthesis method of claim 10 wherein said user-specified dimension criteria for either said x or said y dimension is a pixel subunit.

12. (Previously presented) The photorealistic image synthesis method of claim 8 wherein splitting is performed in a z dimension.

13. (Original) The photorealistic image synthesis method of claim 12 wherein, for opaque objects, said z dimension is successively

split in a direction extending outwardly from a view point so as to find a first root.

14. (Previously presented) The photorealistic image synthesis method of claim 13 wherein, for transparent objects, said z dimension is successively split in a direction extending from a user selected distal extremity in said z dimension inwardly toward a view point so as to find all roots.

15. (Previously presented) The photorealistic image synthesis method of claim 8 wherein a set inversion is performed over a parametric domain to narrow unknown parametric variables.

16. (Previously presented) The photorealistic image synthesis method of claim 15 wherein, subsequent to said narrowing of unknown parametric variables, a box of said boxes representing select areas within said local coordinate system is shaded and sent to said output array of pixels.

17. (Previously presented) The photorealistic image synthesis method of claim 16 wherein boxes of said boxes representing select areas within said local coordinate system contributing to an area of a pixel are integrated to generate a single output result for said pixel.

18. Canceled

19. (Previously presented) The photorealistic image synthesis method of claim 1 wherein said non linear function is implicit.

20. (Original) The photorealistic image synthesis method of claim 19 wherein an interval set inversion is performed over a domain of a screen coordinate system.

21. (Original) The photorealistic image synthesis method of claim 20 wherein, in furtherance of assessment of consistency against said screen coordinate system, boxes representing areas in a local coordinate system are transformed into said coordinate system of the screen.

22. (Previously presented) The photorealistic image synthesis method of claim 21 wherein splitting of said successive splitting each object of the objects of the physical three dimensional object scenes is performed in x and y dimensions of said domain of a screen coordinate system.

23. (Original) The photorealistic image synthesis method of claim 22 wherein said splitting is terminated upon satisfying a user-specified dimension criteria for either said x or said y dimension.

24. (Original) The photorealistic image synthesis method of claim 23 wherein said user-specified dimension criteria for either said x or said y dimension is a pixel subunit.

25. (Previously Presented) The photorealistic image synthesis method of claim 22 wherein splitting is performed in a z dimension.

26. (Original) The photorealistic image synthesis method of claim 25 wherein, for opaque objects, said z dimension is successively split in a direction extending outwardly from a view point so as to find a first root.

27. (Previously Presented) The photorealistic image synthesis method of claim 26 wherein, for transparent objects, said z dimension is successively split in a direction extending from a user selected distal extremity in said z dimension inwardly toward a view point so as to find all roots.

28. (Previously Presented) The photorealistic image synthesis method of claim 27 wherein boxes contributing to an area of a pixel are integrated to generate a single output result for said pixel.

29. Canceled

30. (Previously Presented) A system for visible surface determination in furtherance of photorealistic rendering in a computer graphics environment, said system comprising:

a. a scene database wherein visual characteristics of objects of an image frame of a scene of said scene database are delimited as geometric functions and,

b. a processor for executing an interval analysis, to a user degree of certainty, for accurately and deterministically ascertaining a visible solution set of an area not exceeding a pixel dimension for a pixel of an array of pixels that form said image frame.

31. (Previously Presented) A method of photorealistic image synthesis utilizing interval-based techniques for integrating digital scene information comprising the steps of:

a. executing an interval analysis upon input parameters of an image frame so as to compute a visible solution set of an area not exceeding a pixel dimension for a pixel of an array of pixels that form said image frame;

b. computing said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of pixels that form said image frame; and,

c. inputting said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of

pixels that form said image frame to a user defined shading function in furtherance of quantitatively assigning a character to the pixel.

32. (Previously Presented) A photorealistic image synthesis system for constructing and/or reconstructing an image of a digital scene, said system comprising a plurality of hierarchal interval consistency solvers for rigorous computation of a visible solution set of a non linear geometric function representing at least a portion of a pixel of the digital scene, and user defined shading routines mutually dependent upon solvers of said plurality of hierarchal interval consistency solvers, said visible solution set of the non linear geometric function representing the at least a portion of the pixel of the digital scene being input to said user defined shading routines.

33. (Previously Presented) A method of visible surface determination in furtherance of rendering an image of a digital scene comprising a series of geometric functions, said method comprising:

a. providing a plurality of interval consistency solvers, said series of geometric functions being sequentially operated upon by solvers of said plurality of interval consistency solvers; and,

b. resolving each parametric variable of parametric variables of each geometric function of geometric functions of said series of geometric functions for each iteration of said each geometric function of said geometric functions of said series of geometric functions.

34. (Currently Amended) A method of visible surface determination in furtherance of reconstructing two dimensional digital images of a three dimensional digital representation of a visual scene, said method comprising:

a. providing an interval consistency solver input comprising a ~~series of~~ geometric ~~functions~~ function defining an element within the visual scene, ~~each geometric function of geometric functions of said series of~~ said geometric ~~functions~~ function having parametric variables;

b. providing a plurality of interval consistency solvers; and,

c. correspondingly resolving each parametric variable of said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ for each iteration of iterations of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ during processing of said interval consistency solver input by solvers of said plurality of interval consistency solvers.

35. (Previously Presented) The method of claim 34 wherein said solvers of said plurality of interval consistency solvers are nested such that a later solver receives as input output of a former solver.

36. (Currently Amended) The method of claim 34 wherein said iterations of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ comprise parsing a two dimensional image plane of the visual scene.

37. (Currently Amended) The method of claim 34 wherein said iterations of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ comprise a set inversion on parametric variables in each of said geometric functions.

38. (Currently Amended) The method of claim 34 wherein said iterations of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ comprises parsing an x-y image plane of the visual scene.

39. (Currently Amended) The method of claim 38 wherein said parsing of the x-y image plane includes a set inversion on parametric variables of said ~~each~~ geometric function ~~of said geometric~~

~~functions of said series of geometric functions~~.

40. (Currently Amended) The method of claim 38 wherein, intermediate parsing steps of said parsing of the x-y image plane of the visual scene, said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ are resolved.

41. (Currently Amended) The method of claim 38 wherein for each parsing step of said parsing of the x-y image plane of the visual scene, said each parametric variable of said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ are contracted so as to retain only contributing values thereof.

42. (Currently Amended) The method of claim 40 wherein said iteration of said geometric function ~~of said geometric functions of said series of geometric functions~~ comprises parsing a pixel of the x-y image plane of the visual scene to a user defined pixel subunit.

43. (Currently Amended) The method of claim 42 wherein, intermediate parsing steps of said parsing of the pixel of the x-y image plane of the visual scene to a user defined pixel subunit,

said parametric variables of said geometric function ~~of said geometric functions of said series of geometric functions~~ are resolved.

44. (Currently Amended) The method of claim 42 wherein for each parsing step of said parsing of the pixel of the x-y image plane of the visual scene to a user defined pixel subunit, said each parametric variable of said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ are contracted so as to retain only contributing values thereof.

45. (Currently Amended) The method of claim 40 wherein said iterations of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ comprise parsing a depth dimension of the two dimensional image plane of the visual scene.

46. (Previously Presented) The method of claim 45 wherein said parsing of the depth dimension of the two dimensional image plane of the visual scene commences with initialization of a depth function for all depth space.

47. (Currently Amended) The method of claim 46 wherein,

intermediate parsing steps of the depth dimension of the two dimensional image plane of the visual scene, said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ are resolved.

48. (Currently Amended) The method of claim 46 wherein for each parsing step of said parsing of the depth dimension of the two dimensional image plane of the visual scene, said each parametric variable of said parametric variables of said ~~each~~ geometric function ~~of said geometric functions of said series of geometric functions~~ are contracted so as to retain only contributing values thereof.

49. (Previously Presented) The method of claim 27 wherein a box of said boxes representing select areas within said local coordinate system is shaded and sent to said output array of pixels.

50. (Previously Presented) The photorealistic image synthesis method of claim 49 wherein boxes of said boxes representing select areas within said local coordinate system contributing to an area of a pixel are integrated to generate a single output result for said pixel.